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ABSTRACT

Noting that both the structural characteristics of television and the characteristics of the viewer may influence comprehension of television news, a study tested the hypothesis that the synchronous presentation of television news will maximize learning for viewers with low prior knowledge of program content. Synchronous and nonsynchronous programs were developed by manipulating original network broadcasts. In both treatments, the audiotrack and visual information were identical; only the order of the visual information was different. Measures of prior knowledge were taken for 45 college freshmen, who were then randomly assigned to view either a synchronous or a nonsynchronous program. Comprehension measures were used to evaluate recall of program content. Results indicated that with prior knowledge held constant, viewers had higher comprehension scores in the synchronous treatment than those in the nonsynchronous one. The study demonstrates that structural features of television news production can help decrease the "knowledge gap," and that visual-verbal synchrony can reduce the differential acquisition of knowledge by helping viewers with low prior knowledge learn as well as viewers with high prior knowledge. (Author/HTH)

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Visual-Verbal Synchrony and Television News:

Decreasing the Knowledge Gap

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ABSTRACT

Both the structural characteristics of television and the characteristics of the viewer may influence comprehension of television news. This study tests the hypothesis that the synchronous presentation of television news will maximize learning for viewers with low prior knowledge of the program content.

Synchronous and non-synchronous programs were developed by manipulating original network broadcasts. In both treatments, the audiotrack and visual information was identical; only the order of the visual information was different.

Forty-five freshmen college students participated in this study. Measures of prior knowledge were unobtrusively taken, then students were randomly assigned to view either a synchronous or non-synchronous program. Comprehension measures evaluated recall of program content.

Viewers had higher comprehension scores in the synchronous treatment compared with viewers in the non-synchronous treatment. With viewers' prior knowledge held constant, comprehension scores were higher for those exposed to the synchronous program compared to a non-synchronous one. This study demonstrates that structural features of television news production can help decrease the "knowledge gap." Visual-verbal synchrony can reduce the differential acquisition of knowledge by helping viewers with low prior knowledge learn as well as viewers with high prior knowledge.

INTRODUCTION

Combinations of visual messages and spoken information may be understood in different ways by viewers. The effectiveness of a snychronous audio-visual presentation may depend on viewers' prior knowledge of the program content, their attitudes towards the program, and their typical purpose in viewing the news.

Many researchers have noted viewers' low levels of recall of television news programming (Stauffer, Frost and Rybolt, 1981; Katz, Adoni and Parness, 1977; Neuman, 1976). It's clear that many individuals do not make productive use of the information they see on television news. When evaluating the factors which influence comprehension, it is possible to consider two broad general classes of variables: characteristics of the stimulus and characteristics of the viewer.

As a property of the stimulus, the synchrony between the visual images in a televised presentation and the spoken language presented simultaneously is an important feature of the medium. For purposes of definition, synchronous presentations exist when the verbal and visual message elements are redundant and presented in simultaneous time order. Non-synchronous presentations exist when the verbal and visual message elements are redundant, but not presented simultaneously in time. For viewers without much background knowledge of the content presented in a news program, the simultaneous presentation of visual components of a message may serve as context cues for storing the verbally presented information in memory (Reese, 1984; Berry, 1983; Woodall, Davis, Sahin, 1983; Gunter and Clifford, 1982; Gunter, 1980). For some viewers, a synchronous presentation may aid comprehension.

Understanding the impact of visual-verbal synchrony for viewers without background knowledge of the program content may help television practitioners to systematically use combinations of visual-verbal messages to elucidate messages whic might otherwise be poorly understood by viewers.

Designing television news programming that is comprehensible to a wider audience opens up the potential for decreasing the "knowledge gap," the difference in information acquisition rates between individuals. Individuals with greater levels of knowledge or interest tend to acquire new information at rates substantially higher than individuals with less knowledge or interest (Ettema and Kline, 1977). According to Olien, Donohue and Tichenor (1983, p. 456), "relative disparities in knowledge increase as the flow of information increases." The theory does not suggest that the "information poor" do not acquire knowledge from the mass media, only that they acquire information at rates substantially different from the "information rich."

Although researchers interested in the knowledge gap phenomenon have typically looked at media's organizational factors which contribute to the inequities between individuals, it is possible to consider how the structural features of the media presentation affect the differential acquisition of knowledge.

Researchers have noted that one structural feature of the news tends to decrease knowledge gaps: the presence of conflict. News stories which emphasize conflict tend to decrease knowledge gaps, so that individuals' knowledge about the conflict is more uniform. Olien, Donohue and Tichenor (1983, p. 458) write: "The type of

knowledge and the way in which information is structured can limit or reduce...[knowledge] gaps." While there are many determinants of the gap, it may be possible to decrease the knowledge gap by using other characteristics of the television stimulus to maximize learning.

This study examines whether visual-verbal synchrony can be used to increase learning by individuals with low prior knowledge of the program content.

This research tests the main hypothesis that a synchronous visual-verbal presentation will affect a viewer's ability to recall televised news information under specific conditions relative to the viewer's prior knowledge. To assess the degree to which a synchronous visual-verbal presentation influences the comprehension of television news, an experimental design is used. A brief overview of the research hypotheses follows below.

H1 Subjects who view a synchronous presentation will have higher levels of recall than subjects viewing a non-synchronous presentation.

H2 Subjects with high prior knowledge of the program content will have higher levels of recall than subjects with low prior knowledge.

H3 Of those viewers exposed to synchronous program, viewers with low prior knowledge will have equal levels of information gain compared with high prior knowledge viewers.

PRIOR RESEARCH

Research on television structural properties and studies of viewer characteristics provide evidence that visual-verbal synchrony may help reduce the differential acquisition of knowledge among individuals with different levels of prior knowledge.

Stimulus Characteristics Defined

Because television can show a sequences of images or still scenes along with a variety of sounds and spoken language, it may offer unique opportunities for learners (Meringoff, 1980; Salomon, 1979; Lesser, 1974). Studies of television's formal features-- its organization and structural characteristics — have examined the effects of pacing and editing (Salomon, 1979), camera angle (Salomon, 1979; Mandell and Shaw, 1973; Lang and Lang, 1971; Wurtzel and Dominick, 1972; Tiemens, 1970), sound changes and sound effects (Huston and Wright, 1983; Char and Meringoff, 1982), the organization of dramatic narrative (Collins, 1983), and repetition (Flagg, 1978).

Visual-verbal synchrony is a structural characteristic of television. It is defined as the presentation of redundant visual and verbal messages which occur simultaneously in time. Reese (1983, p. 80) has defined the redundant and simultaneous presentation of a television message as "redundancy," noting that it "refers to shared information, such that there are facilitative and not contradictory relationships between words and pictures." In this study, redundancy refers only to the number of shared referents between visual images and verbal messages in a news presentation, without considering the

temporal ordering of specific visual shots or units of verbal elements. For example, stories about dramatic fires or other highly visual events are likely to have greater redundancy, since the verbal message and the visual images will closely correspond. Stories which are non-visual in nature generally make less use of redundancy, because it is hard to find newsfilm to match the verbal message. For example, foreign news and economic news often do not have great redundancy between visual and verbal elements.

Synchronous television presentations present redundant visual and verbal messages which correspond in temporal order. For example, imagine a narrator's voice saying, "The fire blazed for hours despite attempts by firemen to control it." When accompanied by a videotape showing firemen at the scene of the fire, the combination is synchronous. When accompanied by a shot of firetrucks racing down a city street, the combination is not synchronous.

Although producers of news programming try for redundant visual information when possible (Tuchman, 1973), concern for synchronicity is not apparent in the typical nightly news program. The rationale for suspecting that synchronous relationships between verbal and visual information may aid recall and comprehension is distilled from four distinct areas of research on media and comprehension: film theory, educational media research, cognitive information processing research, and broadcasting research.

Kracauer's (1960) analysis of the role of dialogue and sound in film provides a useful system of categories that delineate the relationship between visual and verbal elements in the mass media. He

differentiated between synchronous and non-synchronous sound on film. Because Kracauer categorized synchronicity by identifying the source of the sound (whether the sound was obtained at the site of the filming, for example), his analysis of synchrony is more valuable to producers than researchers. However, like other film theorists, Kracauer believed that the aesthetic potential of film was achieved only when visual images and spoken language were neither redundant nor synchronous, but when each symbol system provided a unique message. To him, the temporal order and arrangement of visual and verbal messages greatly affected the viewer's perception and interpretation of information.

Studies of Educational Media

At the heart of it, interest in television and film structure is based on its potential to influence human thought. Just as mass printing had an important influence on human thought and human societies, the analogy to the electronic media is equally provocative. McLuhan's (1964) aphorism "The media is the message" articulates the essence of thinking about the influence of the structural properties of the mass media apart from the influence of message content. In some way, media structures extend human perception and human thought. Some investigations in educational media have attempted to quantify this provocative theory.

Researchers have looked at the relationship between spoken language and visual images for its educational potential. The arrangement of visual and verbal messages of television might help viewers to better understand a message by simulating or extending processes of perception.

In one of the earliest reviews of the relationship between audio and visual message, Hartman (1961) reviewed educational media and cognitive research, concluding that an increase in learning could occur when redundant audio-visual information was simultaneously presented. He believed that the relationship between the modality or channel used to present information has an effect on learning.

Severin (1967) attempted to find evidence to support this theory by examining learning under different audio-visual conditions. He paired vocabulary words with pictures to examine the learning of 7th graders. Learning was enhanced when similar information was presented on two channels, with the audio plus related picture condition resulting in the highest performance.

Research points out that viewers tend to rely on the visual information when presented with simultaneous visual-verbal channels. Peeck (1974) studied the relationship between pictorial material and words, and found that when contradictory information was presented by words and pictures, children relied on the pictorial information to answer comprehension questions. This study suggests that pictorial material may be processed differently from verbal material, and that synchrony between words and images may influence the extent to which information from visual-verbal presentations can be understood.

Studies of Television News

Reese (1983) conducted a direct manipulation of the synchrony between the verbal messages and the visual images of television news programs, in an attempt to assess the impact of the simultaneous presentation of audio-visual information on learning. He experimentally created news programs that contained identical verbal content and

visual images, but with the camera shots edited only in the non-redundant versions so that the visual and verbal messages were not synchronous. Viewers watching the original news segments had higher recall and fewer errors than viewers watching the manipulated versions.

Drew and Grimes (1985) examined visual-verbal redundancy and visual recall, finding that individuals who viewed synchronous programs had better recall of the television program's visual elements than those who viewed a non-synchronous program.

Content analyses of television broadcasting have outlined the relationship between visual and verbal information. Davis (1975) studied the characteristic combinations of visual-verbal presentations on network television documentaries, outlining the proportion of time in which different formats were used. An analysis of 15 network documentaries revealed that news documentaries primarily consist of two structural techniques: 1) a voice over narration over visual information containing people or places and 2) talking head interview technique. These two techniques accounted for 75% of every news documentary. It is clear that the combination of images and voice-over sound is a vitally important characteristic of non-fiction television.

As yet, research has not examined the role of visual-viewers' synchrony as it relates to viewer characteristics, including viewers' prior knowledge, their media use habits and their attitudes towards television news. Structural features like visual-verbal synchrony may help the comprehension skills of individual viewers. This study attempts to fill this gap.

Viewer Characteristics

Because each viewer brings a repetoire of attitudes and learning skills to the viewing experience, researchers have traditionally explored those attitudes and abilities in order to explain the huge individual variation surrounding television viewing activities.

In studies of media and learning, variables were selected to correlate with comprehension which did not provide much useful information about the processes of television comprehension. For example, variables like level of education and age were used to account for much of the variation in people's ability to remember news broadcasts (Chu and Schramm, 1967). But these variables do not provide much insight to researchers in the construction of meaningful theoretical assessments of how people assimilate new information. For example, since prior knowledge of current affairs correlates with education (Berry, 1983), the variable of educational level may mask the more specific causes of individual variation.

Researchers from the tradition of cognitive information processing have predicted that information from two different symbol systems, say, visual images and verbal information, would create a greater cognitive load and be more challenging to process (Norman, Gentner and Stevens, 1976; Olson, 1976; Broadbent, 1958).

Woodall, Davis and Sahin (1983, p. 14) point out that visual information may aid depth of information processing. Visual information should serve to deepen processing and therefore understanding when the visual cues that act as context are closely linked to verbal content by being either repetitive or redundant, or by complementing

verbal content by adding new information in some way. In such cases, the visual context should deepen processing by activating more nodes within a viewer's semantic network.

When a person's prior knowledge of the topic is great, it is easier to integrate new incoming information related to that topic (Bruner, Olver and Greenfield, 1966; Olson and Bruner, 1974). The bigger a person's repetoire of information, the easier it is for them to add new information to it.

In a study of news and political cognition, Graber (1984) examined the news consumption habits of 21 individuals. She looked closely at a variety of information-processing strategies employed by these individuals, including avoiding information, and checking and matching strategies in managing information flow. She found that subjects high on prior knowledge ratings showed higher learning rates than those subjects with low prior knowledge.

Visual-verbal synchrony may be more helpful to the viewer whose prior knowledge of the content is low. A synchronous television news segment provides information which gives the viewer simultaneous complementary messages in both audio and visual channels. For viewers who have a less well developed repetoire of background information, the visual portions of a highly synchronous presentation may serve as the necessary cues to help the viewer code, store and retrieve information from memory. Clearly, the amount of prior knowledge a viewer has may influence the degree to which a synchronous presentation of information is effective.

RESEARCH METHODOLOGY

The research uses an experimental design: subjects view either a synchronous or non-synchronous television treatment. Before viewing, measures of subjects' prior knowledge of program content, their attitudes towards news programming and their typical viewing purpose were obtained. Subjects viewed either highly synchronous television news segments or non-synchronous news segments, and measures of comprehension and recall are taken. Administration procedures, development of the television stimulus and measures are described below.

Administration Methods

Participants in this study included freshman women enrolled in a two-year college in suburban Boston. The entire freshman class, consisting of approximately 220 students, was approached to participate in a research project. Fifty six students attended the preliminary meeting for the research project, where students answered the pre-test questions. At that time, they were randomly divided into two groups: each group was told to meet in different locations on the same day and time, one week following the date of the initial meeting.

At the second meeting, half the students met in the school's audio-visual auditorium and the other half of the students met in the college student center lounge (N=45). Analysis of the 11 students lost between the first and second session reveal no significant differences in attitudes between the sample and the lost students.

Students viewed either the synchronous or non-synchronous program on large screen televisions designed for group viewing. The two sites had no differences in viewing conditions. At the completion of the

administration of the post-test measures, students were told about the purpose of the study and were given a token gift of appreciation for their participation in the study.

The homogeneity of the sample— age, gender and ability similarities-- are outlined as issues which influenced selection of the site.

The relative homogeneity of the student population (college women) is seen as both an advantage and disadvantage for this study. Similarity of age, gender and ability are variables that may reduce the wide variance that has been commonly found in surveys of recall of news programs (Neuman, 1976; Seal, 1984). By reducing the recall variance by using individuals of the same gender and approximately the same age, it may be possible to identify factors which explain differences in television news comprehension.

The disadvantage of using individuals of single gender, age and ability level mainly centers around the generalizability of the analysis. However, although interest in and recall of television news differs along these variables, there is no theoretical reason to believe that cognitive processing among adult viewers of television differs as a result of gender or age. An important goal for researchers is to understand why adolescent women are less likely to adopt an interest in news and current affairs. Clearly, the lack of this knowledge can be viewed as a liability in adult development and inhibits full participation in democratic society (Graber, 1984).

Development of Television Stimulus

A short stimulus tape was created in which both versions were identical in visual and verbal content, with only the relationship of

the visual to the audiotrack or verbal messages being manipulated. The differences between the videotapes is the degree of synchronicity -- that is, in the synchronous videotape version, the visual message is edited so that the visuals match the information contained in the verbal message at each point in time. When the verbal message contains information about a concrete object or event, the visual message illustrates that object or event. In the non-synchronous version, the identical verbal information is paired with the visual images distributed in a different order.

To aid in generalizability, national network news programs were deliberately chosen, instead of creating a unique experimental news segment based on local news events. Some research evidence suggests that variation in viewer's ability to recall television news may be related to both presentation characteristics and program content (Neuman, 1976; McDaniel, 1973). News stories similar in content were necessary in order to apply the assumption that differences in comprehension would not be a result of different news content. Viewers differ in their interest in foreign news items, local items, economic and political news. This strategy was used to reduce the variation in recall and comprehension which may be due to viewer's preference for human interest stories, their dislike of economic and foreign news stories, and other variations which are related to the content of the televised information. For this reason, only news stories which fell into the broad content category of science and health stories were used.

This study strengthens the methodology for analyzing visual-verbal synchrony and its effects on comprehension. In the most recent study of synchrony (Resse, 1984), only the non-synchronous version was manipulated, while the original network news broadcast was used to represent the synchronous version.

In this study, both the synchronous and non-synchronous versions were manipulated from existing network news footage, to insure that differences in comprehension were a result of the structural feature of the broadcast.

An important step in the construction of the television stimulus consisted of matching the audiotrack component to the still photographs to create the synchronous experimental version. The audiotrack was broken into small units which represented idea chunks. Then each of the video shots for the segment were described concretely in words. A shot of an earthquake fault, for example, is described in the words, "Long fault line in the earth." The audiotrack unit chunks and the video shot descriptions were compared. In the case above, the video chunk was paired with the audio unit which reported, "The fault line of the earthquake was more than 25 miles long."

The pairing of purposefully distracting visual information with audio information was avoided, because the function of distracting visual information to audio information requires a distinct methodological framework and research design not under investigation in this study.

The final step in the development of the storyboards was the preparation of the storyboards for presentation to validity raters. The

goal of the validity testing was to investigate this question: In which of the two treatments does the video image present information which is most redundant to simultaneously presented verbal information?

Raters were asked to compare two photographs which represented shots from a television news program. They were presented with a pair of storyboard cards. Each had the same verbal information, but one of the pair was from the synchronous storyboard version, and the other was from the non-synchronous version. Raters were asked to read the verbal information— which was identical on both cards-- and then choose which of the two photographs they thought best matched the verbal information.

The use of this specific strategy as a validity test rests on an assumption about the concept of synchronicity which should be made explicit. The relationship of a visual image to a verbal message can not be easily conceptualized by a number, so that we cannot say a specific combination of words and images has some percentage of synchronicity, or some level or amount of synchronicity. However, it is possible to indicate whether a picture-word combination is more or less synchronous when compared with another picture-word combination. Based on the idea that synchronicity is not an absolute concept but a relative one, this measurement of validity is an appropriate one.

Validity measures were obtained by taking the proportion of agreement scores out of the total choice scores. For the news story on salt and high blood pressure, validity measures indicate 86% agreement. For the news segment on the Old Faithful geyser, validity

measures are 88.8% agreement. For the story on the medflies in Florida, validity measures are 93% agreement. These ratings suggest that there is a broad consensus about the synchronicity of combinations of visual information paired with verbal information.

Research Instruments: Measures of Prior Knowledge and Comprehension

Prior knowledge measures were pre-tested in order to assess the degree to which they discriminated among students' levels of knowledge about the three program topics.

Questions about student prior knowledge of the program content were embedded in a test of general current affairs. Embedding the prior knowlege questions in a current affairs context provides a naturalisitic measure of subjects' prior knowledge without overtly sensitizing subjects to the content of the television news segments (Graber, 1984).

Cued recall was the primary measure of recall. Multiple choice questions may serve as a cue for locating information stored in episodic memory (Berry, 1984). These questions were designed to assess how much specific information each subject could recall about a news segment, so that the printed questions serve as cues for recall. Information in the questionnaire items focused on important concepts and factual information central to the story. In piloting, the cued recall items were administered to a group of 10 students, who did not participate in any other pre-tests. Their responses helped the experimenter to revise the items to include plausible incorrect answers and to insure that the questions were appropriate to the level of viewer's recall abilities.

In conjunction with the cued recall measures, subjects were asked to rate their degree of confidence about the correctness of their response. Confidence scales are commonly used to maximize the variance of the recall scores, since as Reese (1983, p. 84) notes, "it is assumed that a subject who is quite sure of a correct response has learned more from a story than one who is not at all sure." It is expected that subjects will have greater levels of confidence in their recall after viewing the synchronous programs when compared with subjects who view the non-synchronous program.

ANALYSIS OF THE DATA

Hypothesis testing of the main effects and analysis of attitude and behavior measures are described below. For purposes of analysis, the alpha was set at the .05 level (one-tailed) for the formal hypothesis testing.

Hypothesis 1 predicts that the synchronous television news treatment will be better recalled by viewers than the non-synchronous treatment. Global comprehension scores ranged from 37.50 to 241.25.[1]

Significant differences were found between the two treatment groups for two of three program segments. When evaluating the global comprehension score, we found that overall, viewers watching the synchronous version have significantly higher global comprehension scores than those viewers watching the non-synchronous version ($F(1,43) = 4.73$, $p < .05$).

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[1]The 28 cued recall questions were scored as correct or incorrect, and the viewer's assessment of level of confidence was multiplied with the recall score, so that scores ranged from 100 for a correct answer with a 100% level of confidence to 0 for an incorrect answer (or occasionally a correct answer with 0% level of confidence, deemed a guess).

TABLE 1

MEANS AND ANALYSIS OF VARIANCE
FOR GLOBAL COMPREHENSION SCORES
IN TREATEMENT GROUPS

Global Comprehension *	Means	Standard Deviation
Non-Synchronous 23	125.68	38.42
Synchronous 22	151.74	41.89

F RATIO = 4.73
PROB = .035

* = significant at the .05 level

Hypothesis 2 examines the influence of viewers' prior knowledge on their ability to comprehend information presented on television news. Prior knowledge scores ranged from 3 to 12.[2]

A viewer's prior knowledge score was found to be highly correlated with subsequent performance on the comprehension questions. Viewers' overall prior knowledge of the program is correlated with their global comprehension score ($r = .47$, $p < .001$). An individual's prior knowledge of the program content is strongly related to the ability to extract information from a televised news program.

[2]Four items for each of the three program segments were obtained for a total of 12 scores. For each of the three segments, the total correct number of scores was obtained, ranging from 0 to 4. A global prior knowledge score represents the sum of responses to all 12 questions.

Hypothesis 3 suggests that of those viewers exposed to the synchronous television program, viewers with low prior knowledge will have equal levels of information gain compared to similar individuals with high prior knowledge.

Prior knowlege scores were dichotomized into high and low conditions, and analysis of variance was conducted. Table 2 shows the means and number of subjects for these conditions. Comparing comprehension scores for subjects in the low prior knowledge category, we see that subjects' comprehension scores average 131.07 in the synchronous treatment, while subjects in the non-synchronous condition average 118.63. Although the group differences display the expected trend, analysis of variance revals no significant differences. This is most likely because the dichotomization of the prior knowledge variance reduces the explanatory power of this variable.

Because prior knowledge was not manipulated experimentally, the two treatment groups are not evenly matched on level of prior knowledge. What is the relationship between prior knowledge and the effect of synchronous or non-synchronous television programs? Analysis of covariance was used to explore this relationship further.

An analysis of covariance was conducted to determine the effect of viewing a synchronous or non-synchronous television program when level of prior knowledge is statistically controlled. Table 2 presents these findings. Because the strong relationship between prior knowledge and comprehension has already been documented in Hypothesis 2, this analysis examined the contribution of the treatment effect first by controlling for the impact of prior knowledge. With prior

TABLE 2

Analysis of Covariance for Comprehension Scores
for Synchronous and Non-Synchronous Treatments
Controlling for Prior Knowledge

ANALYSIS OF COVARIANCE
Controlling for Prior Knowledge

Source of Variation	DF	F Ratio	Probability
Treatment Group	1	5.590	.023
Two-Way Interaction	1	.406	.527

knowledge as the covariate, the difference between the synchronous and non-synchronous viewing groups was still significant ($F(1,43) = 5.59$, $p < .05$).

DISCUSSION OF CENTRAL HYPOTHESES

1) Does a Synchronous Visual-Verbal News Presentation Aid in the Comprehension of Television News?

This study confirms the recent findings of Drew and Grimes (1985) and Reese (1983) which indicate that a synchronous visual-verbal presentation improves viewer comprehension. Viewers learn more from a

synchronous news program than from a non-synchronous news program. In a synchronous program segment, the visual information may be used more efficiently due to the convergence of messages received in both channels.

Some film theorists and media producers have downgraded or avoided the use of visual-verbal synchrony because of their respect for the value of a non-synchronous presentation. A non-synchronous presentation style allows producers to create a richer and more artistically satisfying work. Viewers may also appreciate the aesthetic complexity of a non-synchronous presentation. However, as this study points out, comprehension may decrease as a result of such a challenge. Explanations for resulting poorer comprehension include interference effects, and inability to encode or access information stored in memory. It may be that for viewers in the non-synchronous condition, futile attempts to integrate the visual information with the verbal information created a greater cognitive load, interfering with ability to process either visual or verbal information independently.

Another explanation relates to theories of cognitive information processing of television, which suggest that verbal information which is stored along with an appropriate context cue, like visual information, might be more easily retreived from memory (Berry, 1984). Evidence from this study suggests that individuals exposed to the synchronous treatment were more readily able to access the verbal information they had been exposed to than individuals in the non-synchronous treatment.

This evidence supports the theory that apart from the message presented, the structure of the medium itself plays an important role in the viewer's experience of extracting information from television.

2) Does Prior Knowledge Affect Ability to Comprehend Television News?

As predicted, the viewer's prior knowledge is a major factor in subsequent learning from television news. When a person's prior knowledge of the topic is great, it is easier to integrate new information in memory because of the presence of a well-developed set of schemas. Viewer prior knowledge was a strong influence on comprehension scores. We can attribute this finding to two interrelated phenomena: cognitive ability and interest level.

3) Do Viewers with Low Prior Knowledge Benefit More from a Synchronous Program than Similar Viewers who Watch a Non-Synchronous Program?

Viewers in this study improved when exposed to a synchronous program regardless of their level of prior knowledge. This study found that synchronous programs helped low knowledge viewers learn as well as viewers with high knowledge, but they do not learn more. Synchronous programs can help reduce the relative differences in information gain among individuals with different levels of prior knowledge, but not the absolute differences between the two groups.

A synchronous visual-verbal presentation provides the viewer with an opportunity to integrate new information in memory, perhaps through effective use of visual information as a context cue to aid in storage and retrieval of verbal information.

IMPLICATIONS

This analysis of television's structural characteristics and viewer characteristics suggests there are several pragmatic fronts to proceed in helping people get more from news and informational programming. First, it may be possible to design television programming that will be more comprehensible to television audiences. A synchronous television format provides a more comprehensible program structure than the currently used strategy which frequently juxtaposes different visual and verbal message elements.

Designing the structure of the programming so that it is maximally comprehensible to low knowledge viewers would be one way to accomplish this goal. This study shows that visual-verbal synchrony enhances the comprehension of viewers so that those with low prior knowledge learn as well as those with high prior knowledge. For content which may be unfamiliar to audiences, a synchronous program would enhance learning.

It is important that news programming adapt its formats to meet the changing information needs of the American public, since many individuals rely on television news as their primary source of information.

As this study has shown, the structure of the television stimulus may serve as an obstacle, especially for viewers with low background knowledge. A news presentation which provides different information in video and audio channels will be less well-understood by all viewers, and will be especially difficult for those without much knowledge of the program content. For a few individuals, processing television news is not difficult, because they have the important

prior knowledge of the content and appropriate attitudes to use the mass media effectively. For many, however, there are formidable cognitive and attitudinal obstacles in extracting information from television news. Another paper generated by this research (Hobbs, 1985) examines those viewer attitudes which inhibit or facilitate learning.

When a television program uses visual and verbal information which contain similar message elements that correspond closely in temporal order, viewers' ability to comprehend the information in the program is enhanced. The influence of the synchronous television structure is apparent for both viewers with much background knowledge of the program content and those with little background knowledge. A synchronous program helps individuals acquire new information regardless of their level of prior knowledge of the program content. This finding suggests that the information-poor might be able to gain more knowledge from television news programming if a synchronous structure were used regularly.

By examining both the influence of the television program and the viewer's contribution to the comprehension of informative content, we come closer to developing an integrated model for understanding the relationship between the audience, the message and the medium.

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